1086-68-1517 **Vikraman Arvind*** (arvind@imsc.res.in), Institute of Mathematical Sciences, CIT Campus, Taramani, Chennai, 600113, India. *Parameterized Complexity and Permutation Group Problems.*

The impact of parameterized complexity on graph algorithms, and its interplay with graph minor theory is a great success story. It is natural to explore this in other problem domains like group-theoretic and number-theoretic computation.

We consider permutation group problems. There are several permutation group problems, e.g., Set Stabilizer and Coset Intersection, with a similar status as Graph Isomorphism: the best-known algorithms are over 30 years old with running time $n^{O(\sqrt{n})}$. This calls for an application of the parameterized complexity paradigm!

Interesting natural parameters for permutation groups already exist. E.g., *the minimum base size, the composition width, the separation number, the orbit size* of a permutation group. Let $G \leq S_n$ be a permutation group and X and Y be n-vertex graphs. We say X and Y are G-isomorphic if some $\pi \in G$ maps X to Y. If G has composition-width k then checking if X and Y are G-isomorphic is in $n^{O(k)}$. Hence, the problem is in XP but we do not know if it is in the W-hierarchy or W[P]. If G has orbit size k, then the same problem is in FPT. Does this problem have polynomial size kernels? We discuss such questions, give some answers, and leave many open problems. (Received September 23, 2012)